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ABSTRACT

This bulletin furnishes information about selecting and planting trees. The tree selection process includes being aware of the physical characteristics of bare root seedlings, containerized seedlings, balled and burlapped, or potted trees and determining the proper size and root ball proportions. The section on tree planting discusses how to: (1) handle the young trees; (2) plant bare root seedlings; (3) avoid transplant shock; (4) determine proper planting depth; (5) and plant burlapped or potted trees. Tree care suggestions include advice about watering, pruning, fertilizing, staking and mulch. A discussion on community forestry cites national needs for community trees, provides advice about municipal contractual arrangements with nurseries and additional guidelines for long term care of city trees. A vignette provides information about Arbor Day. Additional sources of information about trees and conservation are described on the back cover of the bulletin. (MCO)

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Bulletin No. 19
James R. Fazio, Editor

TREE CITY USA
BULLETIN
for the
Friends of Tree City USA

How to Select and Plant a Tree

Encouraging America to plant trees is a worthwhile goal, but it's only 'half the story.' Whether planting two trees in the backyard or one million in a city, the effort will come to naught unless the trees are selected and planted correctly. True success is a tree in its new home that is vigorous from the start and lives a long, productive life. This issue of the Bulletin is dedicated toward that goal.

Planting a tree is the ultimate act of optimism and sharing. It is the one act within reach of nearly every man, woman and child to improve the environment and make this world a better place. It is repayment of our debt to nature for the air we breath and the joy we know from bird songs, summer shade or the calming beauty of shimmering leaves. As so well said by John Denver, it is "a promise to the earth."

Apart from the physical benefits of planting a tree, there are also the social benefits of working together to beautify a neighborhood or improve a park. "Friendship is the spirit of the forest," wrote naturalist Enos Mills at the turn of the century, and it is as true of the urban forest as it is of the wilder places in rural America. The benefits of trees are given without prejudice, and the act of planting a tree offers common ground and a natural bond among all humans.

But planting a tree is not to be taken casually. It requires planning, great care and a knowledge of trees and their needs. The American Forestry Association estimates that young trees will grow twice as fast when planted correctly and will live at least twice as long as trees improperly set out. It is essential, then, to know the basic rules for selecting and planting trees.

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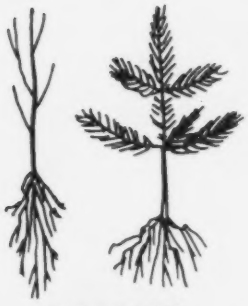
Selecting Your Tree

Trees are for a lifetime, so it pays to spend time now making sure you get the best. In fact, several months before you plant is not too soon to start shopping. Here are four steps to help you make the right decisions:

1. Think clearly about the purpose of your new tree (Examples: shade, privacy, aesthetics, windbreak, etc.).
2. Write down the limitations of the site where you will be planting (Examples: overhead wires, confined root zone, dry climate, clay soil, etc.).
3. Select the species or cultivar to plant that best matches the above conditions you have identified.
4. Examine the trees before you buy, and buy for quality:

Buy only from reputable nurseries (local or mail order). Are they members of professional organizations such as the Mailorder Association of Nurseries or the American Association of Nurserymen? If local, do they have knowledgeable staff to answer questions and care for trees properly "behind the scenes?"

Look for these physical characteristics in your trees:



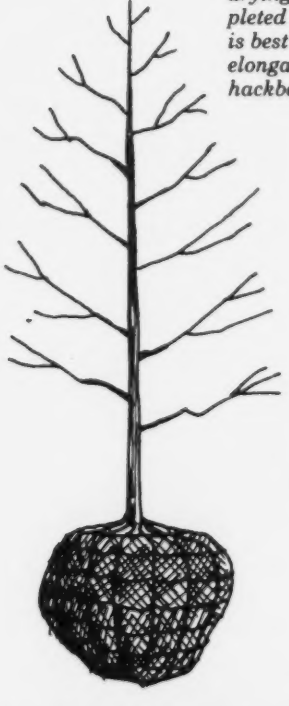
BARE ROOT SEEDLINGS

- Roots should be moist and fiberous.
- Deciduous seedlings up to 10" in height should have roots approximately equal to the stem length; from 12" - 24", look for roots approximately 10" - 12" long.

NOTE: Bare root trees of large sizes are also available, but at fewer and fewer nurseries. It may be worth locating a source, as this can often save you 30 to 50 percent of the cost. Careful storage is necessary to prevent drying and planting must be completed before dormancy ends. Success is best with species that continue stem elongation all summer, such as locust, hackberry and elm.

CONTAINERIZED SEEDLINGS

- The soil plug should be moist and firm.
- Avoid tall, spindly tops. Well developed roots are more important than height of the seedling.



(B & B) BALLED AND BURLAPPED

POTTED

Roots

- Is the root ball adequate for the tree's size? (See chart)
- Are large, circling roots absent? (Check this by feeling down into the top 3" or 4" of the soil ball or pot.)
- Are pruned roots cut cleanly and no wider than an average finger?
- Are soil and roots joined tightly, indicating gentle handling?

Crown/Branches

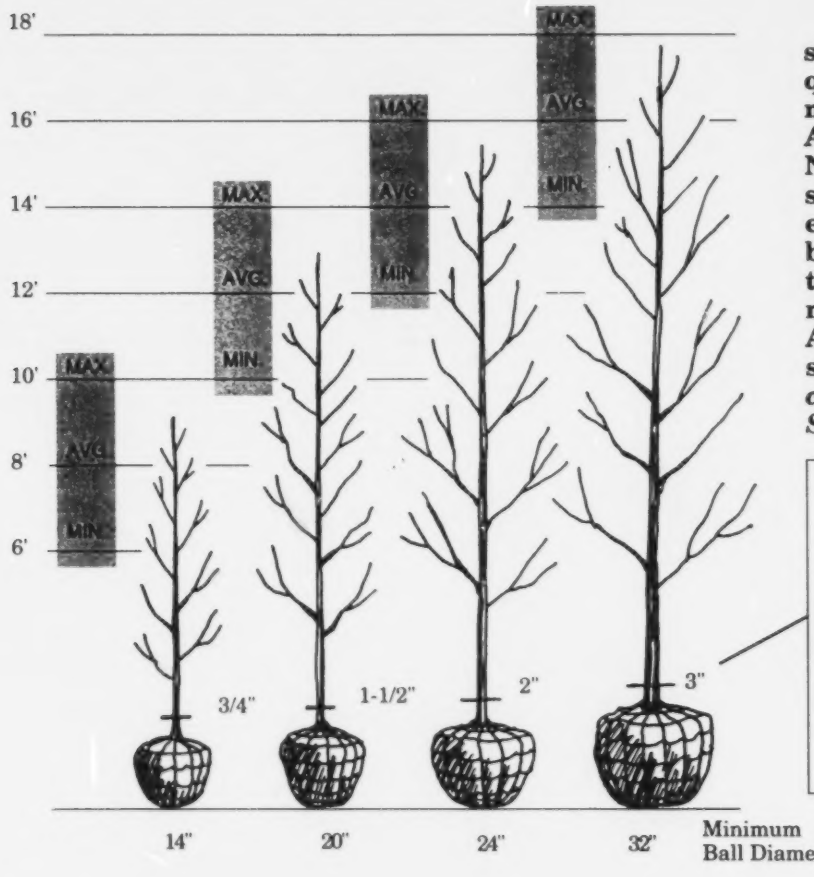
- Is the tree symmetrical?
- Is there a single, well developed leader?
- Are buds plump and healthy looking?
- Are branches well distributed around the trunk and considerably smaller than the trunk?
- Do branches approach the ideal spacing of 8" - 12" apart and form at least a 45 degree angle with the trunk?

NOTE: Avoid trees that have been "headed back," the undesirable practice of pruning off the ends of branches. This gives a young tree a fuller-looking top, but prevents it from ever developing its natural form.

Trunk

- Is it reasonably straight?
- Does the trunk taper nicely?
- Is the bark free of cuts and scrapes? (Reject trees with wounds wider than 1/4 the circumference of the trunk.)
- Are pruning wounds healed over?
- Is it free of frost cracks, sunscald, swollen areas and evidence of insect injury?

How to Check Proper Size and Root Ball Proportions



To reduce transplanting shock and assure that adequate feeding roots are moved with the tree, the American Association of Nurserymen have established standards for height-diameter relationships and root ball sizes. This chart illustrates these standards for most deciduous shade trees. A more complete range of sizes may be found in *American Standard for Nursery Stock* (See page 8).

What is Caliper?

Trunk diameter on young trees is referred to as its caliper size. For standardization, this measurement is taken 6" above the ground on trees with a diameter of 4" or smaller, and 12" above the ground on larger planting stock. The diameter of larger trees is measured approximately 4 1/2 feet above ground level and is expressed as diameter breast high (DBH).

When is Arbor Day?

The original Arbor Day was celebrated on April 10, 1872. In 1885 this tree planting holiday was moved to April 22 to honor the birthday of its founder, J. Sterling Morton. Later, in 1970, this date was selected as the first Earth Day. Today, by proclamation, National Arbor Day is the last Friday in April.

Trees, however, do not respect legislative fiat. This is why many states have their own unique date for Arbor Day, such as Florida's third Friday in January or Alaska's third Monday in May. States can set the date to coincide with the best time to plant trees.

Members of The National Arbor Day Foundation receive a beautiful wall calendar each year complete with the official date of each state's Arbor Day, the state tree, and the address and phone number of the state forester.

Acts of creation are ordinarily reserved for gods and poets, but humbler folk may circumvent this restriction if they know how. To plant a pine, for example, one needs be neither god nor poet; one need only own a shovel. By virtue of this curious loophole in the rules, any clodhopper may say: Let there be a tree—and there will be one. If his back be strong and his shovel sharp there may eventually be 10,000. And in the seventh year he may lean upon his shovel, and look upon his trees, and find them good.

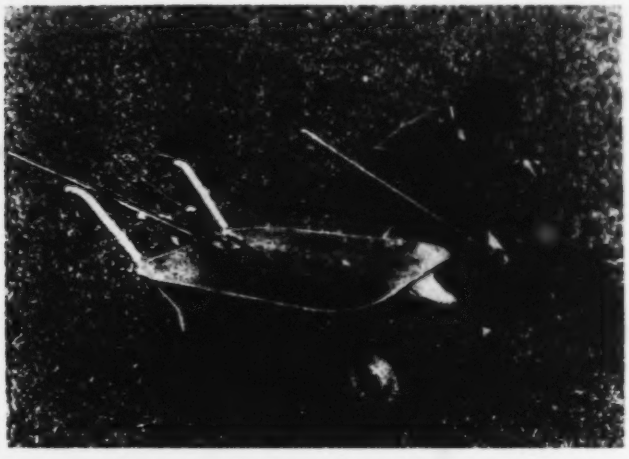
—Aldo Leopold

How to Plant a Tree So It Lives

The goal of tree planting is to have a vigorous, healthy tree that lives to the limits of its natural longevity. Achieving this goal begins with careful tree selection. Next, the tree must be handled carefully until it is safely installed in its new home.

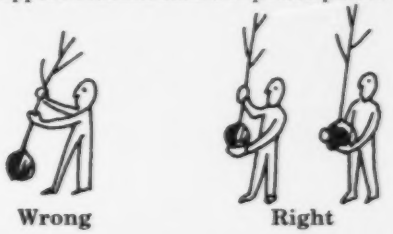
Trees — Handle With Care

Trees are perishable products and must be treated accordingly. Reputable nursery operators know how to protect trees in shipment or while on display, but after that it is up to you. These two cardinal rules will help keep your trees alive until you get them into the ground.



Guaranteed disaster! Tiny root hairs of bare root seedlings dry quickly. Once robbed of their moisture they will not recover. During the planting operation, wrap in wet burlap to protect from sun and wind, and keep moist at all times.

1. **Carry trees carefully.** When transporting, load and unload gently, being careful not to break branches. Always provide support beneath balled or potted plants.



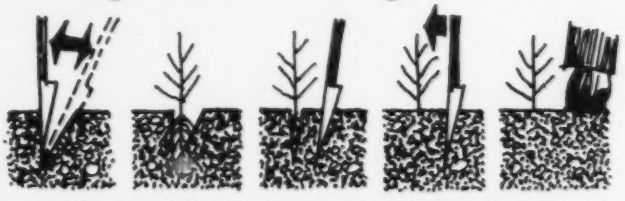
Wrong **Right**

2. Keep roots moist! Depending on the trees and how long you must store them before planting, techniques to prevent drying vary. They include re-dampening the packing material around small bare root seedlings and storing in a refrigerator between 30 - 40 degrees F. Bare root trees of all sizes may also be stored by placing the roots and their packing material under loose soil in a shallow trench. The garden often is a handy place to do this. While actually planting, continue to protect the roots from wind and sun by wrapping in wet burlap or carrying in a bucket with a mud, moss or sawdust solution (not pure water).

   Balled and burlapped or potted trees should be checked for dryness by finger length probing into the soil. Sprinkle or water if necessary. Then store them in a cool garage or shaded area out of the wind.

Tip: Buy early in the season to get the best selection of trees — then plant without delay.

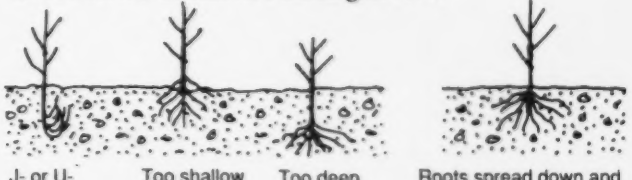
Planting Bare Root Seedlings



In light or sandy soil, a planting slot makes the job fast and easy. Planting small seedlings in a garden or other temporary spot for the first year is a way to assure better protection, watering and weed control until the seedling is larger. Then it may be transplanted to a permanent location.

In heavier (clay) soil or when planting larger bare root stock, it is best to use the shovel and hole method. This prevents soil compaction and glazing of the hole's sides, allowing new roots to spread more easily.

Avoid These Common Planting Errors:



J- or U-shaped roots. Hole not large enough.

Too shallow or soil washed away

Too deep

Roots spread down and outward. Soil level even with root collar (soil level where the seedling was grown in the nursery)

Wrong **Right**

Transplant Shock—and How to Avoid It

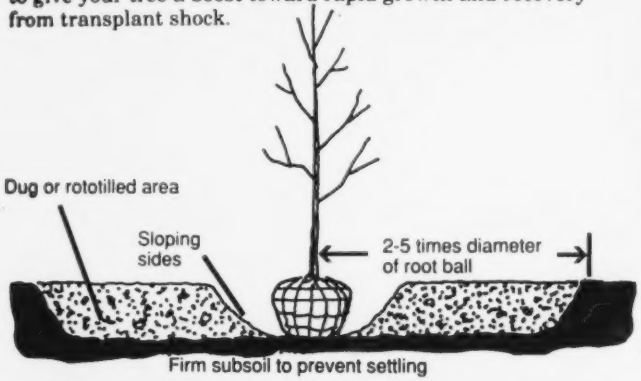
George Ware of the Morton Arboretum explains that any transplanted tree underg s severe physiological shock. This is because the tree's capacity for water absorption is greatly diminished from root loss while its demands for water continue. The challenge is to keep root hairs from drying or being damaged and to use planting techniques that induce rapid root growth so a favorable root/crown ratio can be restored before drought, insects or some other stress event occurs.

Planting Burlapped or Potted Trees

Recommendations for planting have evolved in recent years as more is learned about the nature of roots and urban soils. Local conditions make generalizations difficult, but here are some guidelines that reflect the latest opinions of tree experts:

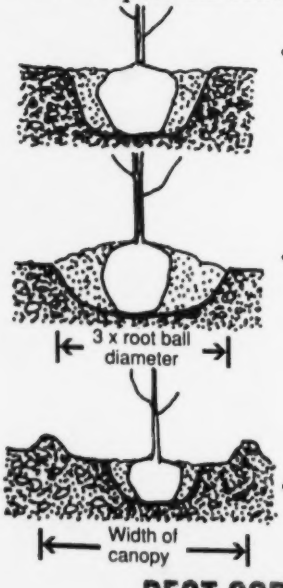
The Planting Hole

More than any other change in tree planting procedures is the new focus on the planting hole. It can be summed up by the saying, "Don't plant a $100 tree in a $10 hole!" Proper preparation will encourage root growth rather than adding to the difficulties already challenging the young tree. Here's the way to give your tree a boost toward rapid growth and recovery from transplant shock.



This method recognizes the fact that most roots spread through the top 12" of soil in a wide periphery around the tree. Therefore, slope the sides of the hole and dig or deeply rototill an area around the hole at least twice the diameter of the ball or container. An area up to five times the diameter is recommended if the soil is particularly compacted, the roots of other trees will not be damaged, and space and aesthetics allow.

How Deep Should You Plant?



- Under normal conditions, root growth is best encouraged by planting even with the surrounding terrain.
- When wet conditions or heavy soil are problems, raising about 1/3 of the root ball above ground will aid the spread of lateral roots.
- In arid climates, a basin can be used to collect precious water.

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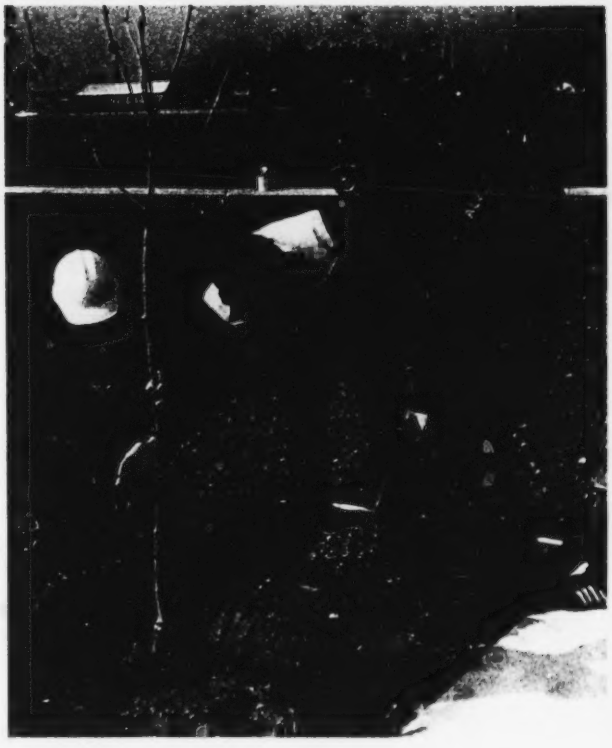


What About the Wrapping Material?

Research has not yet provided a definite answer about the potential harm of leaving wire baskets in place after planting. However, the most prudent action is to cut and remove the top two tiers of wire after the ball is set in the hole. Problems more serious than wire baskets are treated burlap (feels like plastic) and nylon rope. Both should be completely removed. Other kinds of burlap and twine, even if biodegradable, should be cut away from the upper 1/3 of the ball. Never let remaining pieces protrude above the soil or they can act as wicks, drying the soil. Trees in pots or cans should be gently removed before planting. Cut away the plastic or metal if the root ball does not slide out easily. Paper or plastic trunk wrappers should also be removed. This material was put on the tree to protect it during shipment and will generally do more harm than good if allowed to remain on the tree.

Filling the Hole

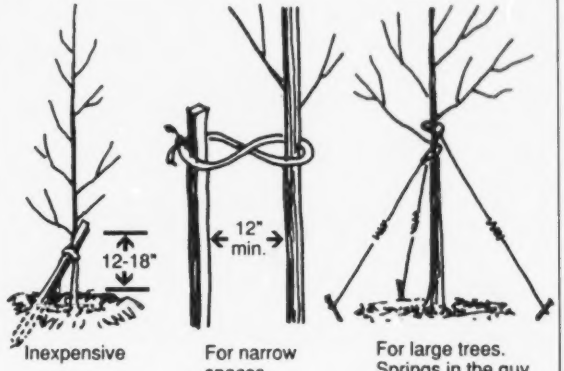
Backfill with native soil unless it is clay from basement excavation or other undesirable fill material. In that case, mix in soil amendments according to instructions from a local nursery, or bring in as much good topsoil as possible. Tamp gently and add water to fill large air spaces and to give your tree its first good drink in its new home. As the tree grows, be sure to water the surrounding soil area to encourage root spread.

Call Before You Dig!

Before digging, always contact your local utility offices. In most areas, the utilities offer to locate and stake underground cables and pipes at no cost to you.

Following Up After Planting

Leave as much leaf area as possible to help the tree build food reserves. Properly prune out dead or broken limbs, or those that rub. Do shaping or corrective pruning the second year.



Stakes vary with space available and personal preference, but should be used only when absolutely necessary.

Mulch is any material placed on soil to protect it and that does not cause the plant problems. Common mulches include bark, wood chips, decorative gravel and crushed lava.

Watering

Watering is the key to tree survival. It should be used when filling the planting hole to eliminate large air cavities, firm the soil around fine roots, and provide nourishment for the new tree. During planting, bare-root trees can be dipped in water-absorbing polymers. This amazing chemical comes under a variety of brand names and is available from nurseries. Its function is to attract water when abundant and hold it longer than soil when conditions get dry. It can also be used with balled and burlapped trees, being mixed with the backfill. The effects last for about two years. With or without the aid of polymers, water deeply around your tree once a week during warm, dry spells.

Pruning

Unless directions specify otherwise, it is better not to prune after planting if the tree will be watered regularly. Leaves manufacture the food needed for root growth, so the young tree needs as much of its crown as possible. Exceptions to this rule include trees that will be exposed to strong winds or drought conditions, in which cases early pruning will reduce the demand for water from the roots. Always prune dead or broken branches. (See Bulletin No. 1)

Fertilizing

Avoid fertilizing shade trees until late spring of the second year following planting. Fertilizers can "burn" roots or stimulate crown growth faster than the roots can supply water.

Staking

Stakes and guy wires should be used only if support is necessary. When using, avoid common problems by following these guidelines:

- If the main stem droops, find the best place for support ties by moving your hand up the trunk to locate the point above which the top can stand up on its own. Place the support ties about 6" above that point.
- Ties can be made many ways, but a loosely-fitted figure 8 tie made of polyethylene, cloth or webbed strap is easy to install, provides good support and cushions the tree from rubbing against the stake. Using two ties will also minimize the chance of bark damage from rubbing.
- Regardless of the tie used, allow slack for sway.
- Avoid driving stakes through the root ball, or using stakes with flanges that will break roots when removed.
- Remove support ties after one or two years.

Mulch

Mulch is a young tree's best friend. It holds down competing weeds or grass, retains soil moisture, prevents soil cracking that can damage new roots, protects the trunk from lawnmower damage, and helps prevent soil compaction. Organic mulches such as wood chips or pine needles also contribute to better soil structure and aeration as they decompose. Avoid limestone rock and allow no mulch to touch the tree's trunk or be piled higher than 2 to 3 inches.

Planting and the Community Forestry Program

Tree planting in the community forestry program is a big need with a big cost. It has been estimated that 75 million trees need to be installed just to fill existing and projected spaces along streets alone. Aging parks, school grounds and other public property expand this figure upward. Considering that the national average for planting one street tree and nurturing it to vandal-proof size is around $400 per tree, a little math reveals that the price of planting trees is considerable.

It is essential to make this investment wisely. The challenge is to make certain that each public planting project is a success, with "success" measured not simply by counting the number of trees placed in the ground, or even how many survive the first year or two. Rather, the successful planting program is one that assures that the new trees have a service life longer than the current national average of only 10 to 25 years.

Start With the Nursery

Planting for survival and long life starts with the tree selection process. For the homeowner, this begins at the point of sale. But in a community forestry program, it begins with a contract between the municipality and a nursery. Bob Skiera, veteran city forester retired from service with the City of Milwaukee, offers this advice about contractual arrangements with a nursery:

1. Do write a contract for the growing and delivery of trees, and do it with the help of both an attorney and an experienced forester or arborist.
2. Use specifications developed by the American Association of Nurserymen (See page 8) rather than making up your own.
3. Work with a local or regional nursery whenever possible, but by all means work only with a nursery that understands how to grow street trees.
4. Where vandalism is a problem, tree mortality can be reduced by specifying that street trees must be over 2" caliper in the nursery and have a high crown. The lowest limbs should eventually be at least 7 feet (6 feet on flowering crab apples).
5. Specify the right to visit the nursery and tag trees before shipment.
6. Be sure to know the origin of seeds, root stock and scions. This is necessary because tree growth and development are so dependent on the species, variety or cultivar being suited to the latitude and altitude of the planting site.

TREE CITY USA

Other selection criteria, such as those suggested on pages 2 and 3, are as important for large projects as for purchases by a homeowner. Of special importance in planting street trees is matching species to the soil pH of the site. Fill material from former building sites and rainwater washing over concrete surfaces tend to raise the alkalinity of soil. Soil pH levels of 7.5 - 8.0 are common in downtown areas, whereas nutrient uptake of most trees is optimal at the slightly acidic level of 6.0 - 7.0. Therefore, it is important to test the soil and select species that can tolerate this essential part of the environment.

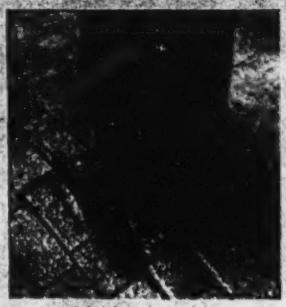
Smaller communities may benefit from guidelines for drafting bid or contract specifications available free from James J. Nighswonger, Urban and Community Forestry, Kansas State University, Manhattan, KS 66502.

Planting for Longer Life

Additional guidelines are suggested by consultant James R. Urban of Annapolis, Maryland. His study of 1,300 sidewalk trees at 13 sites in eastern cities correlated the condition of each tree with a wide range of environmental and managerial factors. The results are contained in the *Proceedings of the Fourth Urban Forestry Conference* and should be required reading for all city foresters.

Here is a summary of suggestions resulting from Urban's findings:

1. The key to growing trees in good condition is the volume of soil available to roots. A minimum of 100 - 200 cubic feet of soil is necessary to sustain long-term growth. (New research suggests 400 cubic feet.)
2. Whenever possible, urban designers would do better to focus on planting trees in lawn areas adjacent to sidewalks rather than using confined tree pits.
3. In developments where symmetrical landscaping is an important element, it is important to design so that each tree has the same amount of soil volume available to it. Otherwise, asymmetrical design should be used.



4. The cost of tree grates and tree guards would be better spent on other things such as importing good soil or providing more growing space. In addition to their high cost, these devices can cause injury to the trees as they grow.

Unless maintained—which is rarely done—grates and other devices around planted trees will cause serious damage as the tree matures.

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Other Sources of Information

Tree City USA Bulletin will inform readers about helpful, up-to-date publications that provide more depth, serve as good models, or are readily available for community distribution. The editor welcomes sample copies to consider for inclusion in revised editions of this and other *Bulletins*.

Planting Guides

Most utility companies and municipalities with a forestry program have produced lists of what species or cultivars do well in the area and those that are prohibited by ordinance or should be avoided for other reasons. Your city or state forester should be able to provide you one that covers your locality. In format, these valuable guides to planting range from single page lists to comprehensive booklets with a wealth of other information about trees. One outstanding example is *Trees For New Jersey Streets*, available for $6.00 from:

New Jersey Shade Tree Federation
Box 231 Cook College
New Brunswick, NJ 08903

The Municipal Tree Restoration Project, a cooperative venture between Penn State University, the USDA Forest Service, several state forestry departments and a consortium of utility companies and nurseries, has resulted in a publication worth far more than its cost of $17.50. *Street Tree Fact Sheets* is a loose-leaf notebook containing full-color photos of over 100 species and cultivars used in street plantings. Accompanying the photos are descriptive data and a summary statement about the trees' advantages, limitations and site requirements. Available from:

School of Forest Resources
The Pennsylvania State University
University Park, PA 16802

In the arid Southwest, a valuable 31-page booklet titled *Desert Trees* has been published as a guide to the best selections for water conservation and longevity. Available for $2.00 (less for quantities) from:

Arizona Native Plant Society
P.O. Box 41206, Sun Station
Tucson, AZ 85717

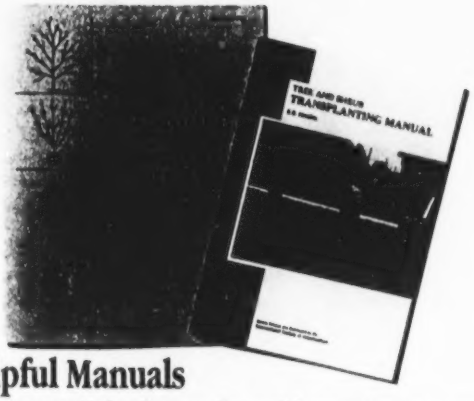
A special issue of *Urban Forests* magazine (April/May 1991) features eight pages of the best ways to plant street and yard trees. It is well illustrated and offers many good suggestions. Available in minimum quantities of 7 at 60 cents each from:

The American Forestry Association
P. O. Box 2000
Washington, DC 20013

TRAINING AVAILABLE

The National Urban Forestry School is a series of three one-week training programs that may be completed in a period of two years or more. The program is intended to complement the education of community foresters. Session I — Introduction to Urban Forestry — is available on request at any location and includes the basics of arboriculture, including planting, and the managerial aspects of community forestry. Session I is also appropriate for serious citizen leaders such as tree board members. Contact The National Arbor Day Foundation for more information.

The Arbor Day Institute
Knowledge for Growth



Helpful Manuals

The essential reference for writing contracts or making purchases in the nursery industry is the 33-page *American Standard for Nursery Stock*. Available for $10.00 from:

American Association of Nurserymen
1250 I St., N.W., Suite 500
Washington, DC 20005

Tree and Shrub Transplanting Manual by E. B. Himelick provides detailed information about selection, soils, digging, planting and caring for new trees. Mechanical tree spades are included. Available for $20 to members, $30 to non-members from:

International Society of Arboriculture
P. O. Box 908 Urbana, IL 61801

To order additional Bulletin copies... Friends of Tree City USA members may obtain a single copy of this or any of the 18 preceding *Tree City USA Bulletins* free of cost. Quantities of any issue are available at 25 for $6.25 or 500 for $100. To order: specify the issue number and quantity, and make your check payable to "National Arbor Day Foundation," 100 Arbor Ave., Nebraska City, NE 68410.

To join the Friends of Tree City USA... To receive a subscription to the *Tree City USA Bulletin*, and to become more involved in the community forestry movement in your town and throughout America, send a $10 dues-donation to Friends of Tree City USA, National Arbor Day Foundation, 100 Arbor Ave., Nebraska City, NE 68410. Make your check payable to "National Arbor Day Foundation."

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